

## Connecting via Winsock to STN

Welcome to STN International! Enter x:x

LOGINID: ssspta1202jxp

**PASSWORD :**

TERMINAL (ENTER 1, 2, 3, OR ?):2

NEWS 1 Web Page URLs for STN Seminar Schedule - N. America  
NEWS 2 "Ask CAS" for self-help around the clock  
NEWS 3 AUG 09 INSPEC enhanced with 1898-1968 archive  
NEWS 4 AUG 28 ADISCTI Reloaded and Enhanced  
NEWS 5 AUG 30 CA(SM)/CAplus(SM) Austrian patent law changes  
NEWS 6 SEP 21 CA/CAplus fields enhanced with simultaneous left and right truncation  
NEWS 7 SEP 25 CA(SM)/CAplus(SM) display of CA Lexicon enhanced  
NEWS 8 SEP 25 CAS REGISTRY(SM) no longer includes Concord 3D coordinates  
NEWS 9 SEP 25 CAS REGISTRY(SM) updated with amino acid codes for pyrrolysine  
NEWS 10 SEP 28 CEABA-VTB classification code fields reloaded with new classification scheme  
NEWS 11 OCT 19 LOGOFF HOLD duration extended to 120 minutes  
NEWS 12 OCT 19 E-mail format enhanced  
NEWS 13 OCT 23 Option to turn off MARPAT highlighting enhancements available  
NEWS 14 OCT 23 CAS Registry Number crossover limit increased to 300,000 in multiple databases  
NEWS 15 OCT 23 The Derwent World Patents Index suite of databases on STN has been enhanced and reloaded  
NEWS 16 OCT 30 CHEMLIST enhanced with new search and display field  
NEWS 17 NOV 03 JAPIO enhanced with IPC 8 features and functionality  
NEWS 18 NOV 10 CA/CAplus F-Term thesaurus enhanced  
NEWS 19 NOV 10 STN Express with Discover! free maintenance release Version 8.01c now available  
NEWS 20 NOV 20 CAS Registry Number crossover limit increased to 300,000 in additional databases  
NEWS 21 NOV 20 CA/CAplus to MARPAT accession number crossover limit increased to 50,000  
NEWS 22 DEC 01 CAS REGISTRY updated with new ambiguity codes  
NEWS 23 DEC 11 CAS REGISTRY chemical nomenclature enhanced  
NEWS 24 DEC 14 WPIDS/WPINDEX/WPIX manual codes updated  
NEWS 25 DEC 14 GBFULL and FRFULL enhanced with IPC 8 features and functionality  
NEWS 26 DEC 18 CA/CAplus pre-1967 chemical substance index entries enhanced with preparation role  
NEWS 27 DEC 18 CA/CAplus patent kind codes updated  
NEWS 28 DEC 18 MARPAT to CA/CAplus accession number crossover limit increased to 50,000  
NEWS 29 DEC 18 MEDLINE updated in preparation for 2007 reload  
NEWS 30 DEC 27 CA/CAplus enhanced with more pre-1907 records  
  
NEWS EXPRESS NOVEMBER 10 CURRENT WINDOWS VERSION IS V8.01c, CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP), AND CURRENT DISCOVER FILE IS DATED 25 SEPTEMBER 2006.  
  
NEWS HOURS STN Operating Hours Plus Help Desk Availability  
NEWS LOGIN Welcome Banner and News Items  
NEWS IPC8 For general information regarding STN implementation of IPC 8

NEWS X25 x.25 communication option no longer available

Enter NEWS followed by the item number or name to see news on that specific topic.

All use of STN is subject to the provisions of the STN Customer agreement. Please note that this agreement limits use to scientific research. Use for software development or design or implementation of commercial gateways or other similar uses is prohibited and may result in loss of user privileges and other penalties.

FILE 'HOME' ENTERED AT 15:00:25 ON 02 JAN 2007

=> file caplus  
COST IN U.S. DOLLARS  
  
FULL ESTIMATED COST

SINCE FILE ENTRY	TOTAL SESSION
0.21	0.21

FILE 'CAPLUS' ENTERED AT 15:00:39 ON 02 JAN 2007  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
COPYRIGHT (C) 2007 AMERICAN CHEMICAL SOCIETY (ACS)

Copyright of the articles to which records in this database refer is held by the publishers listed in the PUBLISHER (PB) field (available for records published or updated in Chemical Abstracts after December 26, 1996), unless otherwise indicated in the original publications. The CA Lexicon is the copyrighted intellectual property of the American Chemical Society and is provided to assist you in searching databases on STN. Any dissemination, distribution, copying, or storing of this information, without the prior written consent of CAS, is strictly prohibited.

FILE COVERS 1907 - 2 Jan 2007 VOL 146 ISS 2  
FILE LAST UPDATED: 1 Jan 2007 (20070101/ED)

Effective October 17, 2005, revised CAS Information Use Policies apply. They are available for your review at:

<http://www.cas.org/infopolicy.html>

=> s cataly? (1) steam (4a) reform? (1) adiabatic?

1354027 CATALY?

210687 STEAM

493 STEAMS

195 STEAM

(STEAM OR STEAMS)

49974 REFORM?

49574 REFORM.  
50628 ADTARATIC?

50028 ADIABA  
77 CATALYST

// CATALYST? (E) STEAM (4A) REFORM? (L) ADIABATIC?

⇒ s 11 and autothermal?

## 1372 AUTOTHERMAL?

L2 14 LT AND AUTOTHERMAL?

=> s 12 and (preheat? or pre (1a) heat?) (s) (feedstock or hydrocarbon)  
49276 PREHEAT?  
210586 PRE  
699 PRES  
210954 PRE  
(PRE OR PRES)

2376185 HEAT?  
17306 FEEDSTOCK  
8004 FEEDSTOCKS  
22508 FEEDSTOCK  
(FEEDSTOCK OR FEEDSTOCKS)  
334832 HYDROCARBON  
336188 HYDROCARBONS  
517310 HYDROCARBON  
(HYDROCARBON OR HYDROCARBONS)  
1549 (PREHEAT? OR PRE (1A) HEAT?) (S) (FEEDSTOCK OR HYDROCARBON)  
L3 0 L2 AND (PREHEAT? OR PRE (1A) HEAT?) (S) (FEEDSTOCK OR HYDROCARBON  
)

=> s 12 and (preheat? or pre (1a) heat?)  
49276 PREHEAT?  
210586 PRE  
699 PRES  
210954 PRE  
(PRE OR PRES)  
2376185 HEAT?  
4429 PRE (1A) HEAT?  
L4 0 L2 AND (PREHEAT? OR PRE (1A) HEAT?)

=> s 12 and monolith  
3953 MONOLITH  
2811 MONOLITHS  
5688 MONOLITH  
(MONOLITH OR MONOLITHS)  
L5 1 L2 AND MONOLITH

=> d 15 ibib ab

L5 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2005:20229 CAPLUS  
DOCUMENT NUMBER: 142:282673  
TITLE: Monolithic structures as alternatives to particulate catalysts for the reforming of hydrocarbons for hydrogen generation  
AUTHOR(S): Giroux, Thomas; Hwang, Shinn; Liu, Ye; Ruettiger, Wolfgang; Shore, Lawrence  
CORPORATE SOURCE: Engelhard Corporation, Iselin, NJ, 08830, USA  
SOURCE: Applied Catalysis, B: Environmental (2005), 56(1-2), 185-200  
CODEN: ACBEE3; ISSN: 0926-3373  
PUBLISHER: Elsevier B.V.  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: English  
AB A review of the current status of developments of monolithic precious metal catalysts for use in small-scale hydrogen generation from hydrocarbons by reforming, steam reforming, water gas shift reaction, and preferential oxidation with minimal carbon monoxide formation for use in proton-exchange-membrane fuel cells. The monolithic catalysts are then used for on-site hydrogen generators for industrial sites and for hydrogen fueling stations for fuel cell-powered automobiles. The advantages of monoliths or heat exchangers were emphasized for each of the unit operations. In reforming, data were presented from high-space-velocity catalytic partial oxidation, autothermal reforming reactors, and coated metal substrate catalysts for steam reforming with enhanced heat transfer. Water gas shift reactor vols. can be decreased significantly using precious metal monolithic catalysts that can endure transient and cyclic start/stop operations. Preferential oxidation reactions were also described, for example, for use in nearly adiabatic ceramic monoliths or nearly isothermal

behavior on a heat exchanger.

REFERENCE COUNT: 49 THERE ARE 49 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> s 12 not 15  
L6 13 L2 NOT L5

=> d 16 ibib ab 1-13

L6 ANSWER 1 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2006:224547 CAPLUS  
DOCUMENT NUMBER: 145:474502  
TITLE: Autothermal CFB membrane reformer for hydrogen production from heptane  
AUTHOR(S): Chen, Zhongxiang; Elnashaie, Said S. E. H.  
CORPORATE SOURCE: Department of Chemical & Biological Engineering, University of British Columbia, Vancouver, BC, V6T 1Z4, Can.  
SOURCE: World Congress of Chemical Engineering, 7th, Glasgow, United Kingdom, July 10-14, 2005 (2005), 83958/1-83958/10. Institution of Chemical Engineers: Rugby, UK.  
CODEN: 69HUFZ; ISBN: 0-85295-494-8  
DOCUMENT TYPE: Conference; (computer optical disk)  
LANGUAGE: English

AB H production by steam reforming of heptane is studied in an autothermal circulating fluidized bed (CFB) membrane reformer. Pseudo-steady-state simulations show that when the catalyst is not regenerated, the Ni reforming catalyst deactivates quickly, especially at high temps. Continuous catalyst regeneration keeps the catalyst activity high (.apprx.1.0) and autothermal operation for the entire adiabatic reaction-regeneration process is achievable when the exothermic heat generated from the catalyst regenerator is sufficient to compensate for the endothermic heat consumed in the riser reformer. For this process autothermal operation is the most efficient. This type of autothermal operation requires careful optimization of the steam to C (S/C) ratio. This ultra-efficient reforming process also shows bifurcation behavior, dictating tight control. Multiplicity occurs when S/C ratio is 1.444-2.251 mol/mol. The maximum net H yield is quite high approaching 15.6 mol H/mol heptane at the lower steady-state when S/C feed ratio is close to 1.444 mol/mol.

REFERENCE COUNT: 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 2 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2005:1246215 CAPLUS  
DOCUMENT NUMBER: 144:314873  
TITLE: Catalytic autothermal reforming of diesel fuel for hydrogen generation in fuel cells  
AUTHOR(S): Cheekatamarla, Praveen K.; Lane, Alan M.  
CORPORATE SOURCE: Department of Chemical Engineering, The University of Alabama, Tuscaloosa, AL, 35487, USA  
SOURCE: Journal of Power Sources (2005), 152, 256-263  
PUBLISHER: Elsevier B.V.  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Polymer electrolyte membrane (PEM) fuel cells require hydrogen as the fuel source for generating power. Hydrogen can be produced in a fuel processor by the catalytic reforming of hydrocarbons. The objective of this paper is to present an anal. of the autothermal reforming (ATR) of synthetic diesel fuel in an adiabatic reactor using a

Pt/ceria catalyst. ATR combines endothermic steam reforming and exothermic partial oxidation reactions in a single unit. This simple system provides higher efficiency and higher energy d. than other conventional processes. The product composition as a function of the operating variables and the temperature and concentration profile inside the

reactor were studied. Hydrogen was generated under adiabatic conditions by heating the feed mixture and ATR reactor to only 400 °C in contrast to higher temps. reported in the literature. The stability of the catalyst and its response to the presence of S poison was also investigated.

REFERENCE COUNT: 45 THERE ARE 45 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 3 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2005:689567 CAPLUS

DOCUMENT NUMBER: 143:424550

TITLE: Autothermal CFB membrane reformer for hydrogen production from heptane

AUTHOR(S): Chen, Z.; Elnashaie, S. S. E. H.

CORPORATE SOURCE: Department of Chemical & Biological Engineering, University of British Columbia, Vancouver, Can.

SOURCE: Chemical Engineering Research and Design (2005), 83(A7), 893-899

CODEN: CERDEE; ISSN: 0263-8762

PUBLISHER: Institution of Chemical Engineers

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Hydrogen production by steam reforming of heptane is investigated in a novel autothermal circulating fluidized bed (CFB) membrane reformer. Pseudo-steady-state simulations show that when the catalyst is not regenerated, the nickel reforming catalyst deactivates quickly, especially at high temps. Continuous catalyst regeneration keeps the catalyst activity high (.apprx.1.0) and autothermal operation for the entire adiabatic reaction-regeneration process is achievable when the exothermic heat generated from the catalyst regenerator is sufficient to compensate for the endothermic heat consumed in the riser reformer. For this process autothermal operation is the most efficient. This type of autothermal operation requires careful optimization of the steam to carbon ratio. This ultra-efficient reforming process also shows bifurcation behavior, dictating tight control. Multiplicity occurs when steam to carbon ratio is in the range of 1.444-2.251 mol/mol. The maximum net hydrogen yield is quite high approaching 15.6 mol of hydrogen per mol of heptane fed at the lower steady-state when steam to carbon feed ratio is close to 1.444 mol/mol.

REFERENCE COUNT: 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 4 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2005:654679 CAPLUS

DOCUMENT NUMBER: 143:232535

TITLE: Numerical simulation of ethanol autothermal reactor for hydrogen production

AUTHOR(S): Buck, Gregory A.; Obara, Hiroyuki

CORPORATE SOURCE: South Dakota Sch. Mines Technol., Rapid City, SD, 5770, USA

SOURCE: Tamagawa Daigaku Kogakubu Kiyo (2005), 40, 41-47

CODEN: TDKOBJ; ISSN: 0371-5981

PUBLISHER: Tamagawa Daigaku Kogakubu

DOCUMENT TYPE: Journal

LANGUAGE: English

AB At their present state of development, hydrogen fuel cells have the capability to provide adequate power for a wide range of stationary and

mobile applications. Despite this fact, long-term sustainability of this technol. rests upon the production of hydrogen from renewable sources, such as solar photovoltaic hydrolysis, microbial production in natural biol. processes, or chemical conversion (reforming) of bio-hydrocarbons. Among the techniques under current study, the partial oxidation of alcs. and other hydrocarbon fuels using either catalyzed (CPO) or uncatalyzed (POX) reactions, offers great promise. A suitable combination of total and partial oxidation supports hydrogen production from ethanol in an autothermal reforming process that requires no external addition of energy. Furthermore, the autothermal reforming process conducted in a well insulated reactor, produces temps. that promote addnl. hydrogen production through the endothermic steam reforming and the water-gas shift reactions, which may also be catalyzed or uncatalyzed, with the added benefit of lowered carbon monoxide concns. In this study, an adiabatic, axisym. ethanol reforming reactor was simulated assuming the reactants (air and ethanol C<sub>2</sub>H<sub>5</sub>OH) and the products (O<sub>2</sub>, N<sub>2</sub>, H<sub>2</sub>O, CO<sub>2</sub>, CO and H<sub>2</sub>) to be in the gaseous state. The gas flows in the reactor were assumed to be turbulent, and the chemical kinetics of a simple four reaction system were assumed to be dominated by the turbulent mixing process. Air flow rates into the reactor were varied for fixed ethanol flow rate to obtain three different levels of oxidation. The numerical results for the reacting flow show that hydrogen production is maximum for an oxidation level between that corresponding to total oxidation

and

that corresponding to partial oxidation. These findings are in qual. agreement with observations from previous exptl. studies.

L6 ANSWER 5 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:670981 CAPLUS

DOCUMENT NUMBER: 141:352589

TITLE: Steady-state modeling and bifurcation behavior of circulating fluidized bed membrane reformer-regenerator for the production of hydrogen for fuel cells from heptane

AUTHOR(S): Chen, Zhongxiang; Elnashaie, Said S. E. H.

CORPORATE SOURCE: Department of Chemical Engineering, Auburn University, Auburn, AL, 36849-5127, USA

SOURCE: Chemical Engineering Science (2004), 59(18), 3965-3979

CODEN: CESCAC; ISSN: 0009-2509

PUBLISHER: Elsevier Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The production of hydrogen for fuel cells by steam reforming of heptane is investigated in a circulating fluidized bed membrane reformer-regenerator system. Palladium based hydrogen permselective membranes are used for hydrogen removal and dense perovskite oxygen permselective membranes are used for oxygen introduction. A series of pseudo-steady-state simulations show that when the catalyst is not regenerated, the circulating nickel reforming catalyst deactivates quickly and the half catalyst activity life for efficient production of hydrogen is quite short, especially at high temps. Efficient continuous catalyst regeneration can keep the catalyst activity high (.apprx.1.0). With continuous catalyst regeneration, autothermal operation for the entire adiabatic reformer-regenerator system is achievable when the exothermic heat generated from the catalyst regenerator is sufficient to compensate for the endothermic heat consumed in the riser reformer. This type of autothermal operation becomes less likely at high steam to carbon feed ratios. This is due to the fact that carbon deposition rate decreases leading to the decrease of autothermal circulating feed temperature and energy-based hydrogen yield (adiabatic hydrogen yield in autothermal reformer-regenerator system). Multiplicity of the steady states for the reformer is possible for this configuration. With the steam to carbon

feed ratio as the bifurcation parameter, multiplicity occurs between the two bifurcation points 1.444 and 2.251 mol/mol. In this multiplicity region, the energy-based hydrogen yield at the upper steady state with high regenerator output temperature is surprisingly the lowest one, while it is the highest one at the lower steady state with low regenerator output temperature. The maximum energy-based hydrogen yield is about 15.58 mol of hydrogen

per mol of heptane fed at the lower steady-state when steam to carbon feed ratio is very close to the bifurcation value of 1.444 mol/mol. After removing the sweep gas steam by downstream cooling and dehumidification, the product hydrogen from steam reforming of hydrocarbons can be used for fuel cells with high purity (.apprx.100%).

REFERENCE COUNT: 35 THERE ARE 35 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 6 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:384129 CAPLUS

DOCUMENT NUMBER: 140:425687

TITLE: Partial oxidation of light paraffins to synthesis gas in short contact-time reactors

AUTHOR(S): Beretta, Alessandra; Forzatti, Pio

CORPORATE SOURCE: Dipartimento di Chimica, Materiali e Ingegneria Chimica "G. Natta", Politecnico di Milano, Milan, 20133, Italy

SOURCE: Chemical Engineering Journal (Amsterdam, Netherlands) (2004), 99(3), 219-226

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The reaction pathways of ethane and propane partial oxidation to synthesis gas were investigated over a Pt/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and a Rh/ $\alpha$ -Al<sub>2</sub>O<sub>3</sub> catalyst. An annular reactor was used for this purpose at high space velocities and at temps. below 700 °C in order to avoid homogeneous reactions. Under fuel-rich conditions, the Pt-based catalyst produced CO and H<sub>2</sub> at high temps. (>550 °C), while CO<sub>2</sub> and H<sub>2</sub>O were the only reaction products at lower temps. The formation of CO and H<sub>2</sub> was consistent with direct oxidation reactions, since contact time had no effect on the product distribution, and secondary reactions (steam and dry reforming) showed negligible activity.

The Rh/Al<sub>2</sub>O<sub>3</sub> catalyst was also active and selective in the partial oxidation of light hydrocarbons, but in this case the production of hydrogen and CO was strongly dependent on contact time, and steam reforming was important even at short contact times. It was concluded that, over rhodium, both direct and indirect routes were probably involved in the formation of CO and H<sub>2</sub>. The main difference between the two noble metals thus seemed to be that Pt mainly produced CO and H<sub>2</sub> by means of O<sub>2</sub> (direct routes), while over Rh the light paraffins were converted to CO and H<sub>2</sub> by means of O<sub>2</sub> and H<sub>2</sub>O (direct+indirect routes). This could explain the remarkably different behavior of the two systems when tested in high temperature autothermal reactors (T>700 °C). Under adiabatic conditions, the partial oxidation of light paraffins led to large amts. of gas-phase olefinic products over Pt, whereas high selectivities to synthesis gas were found over Rh. The mechanistic results suggest that this different behavior could be due to the varying capability of Pt and Rh surface reactions to compete with homogeneous reactions.

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 7 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:269876 CAPLUS

DOCUMENT NUMBER: 140:289193

TITLE: Process for the production of synthesis gas by the

INVENTOR(S): steam reforming of a hydrocarbon feed  
 Aasberg-Petersen, Kim; Dybkjter, Ib; Christensen, Peter Seier; Rostrup-Nielsen, Thomas; Erikstrup, Niels; Hansen, Jetts-Henrik Bak  
 PATENT ASSIGNEE(S): Den.  
 SOURCE: U.S. Pat. Appl. Publ., 13 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004063797	A1	20040401	US 2003-667389	20030923
EP 1413547	A1	20040428	EP 2003-20673	20030911
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
JP 2004149406	A	20040527	JP 2003-331066	20030924
CA 2442491	A1	20040326	CA 2003-2442491	20030925
NO 2003004285	A	20040329	NO 2003-4285	20030925
AU 2003248389	A1	20040422	AU 2003-248389	20030925
ZA 2003007450	A	20040706	ZA 2003-7450	20030925
KR 2004027440	A	20040401	KR 2003-66831	20030926
CN 1498850	A	20040526	CN 2003-164880	20030926

PRIORITY APPLN. INFO.: DK 2002-1435 A 20020926  
 AB A process and system for the production of synthesis gas (i.e., H<sub>2</sub>-CO mixts.) from a hydrocarbon feed (e.g., natural gas) comprises endothermic and/or adiabatic catalytic steam reforming and autothermal steam reforming in series, where the steam reforming is carried out in one or more endothermic stages in series or in one or more adiabatic steam reforming stages in series with intermediate heating of the feed stock gas leaving the adiabatic reforming stages and where the carbon monoxide-containing gas, characterized by having a molar ratio of hydrogen to carbon of less than 4.5, is added prior to at least one of the endothermic or adiabatic steam reforming stages and/or prior to the autothermal steam reforming step. Process flow diagrams are presented.

L6 ANSWER 8 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2004:121127 CAPLUS  
 DOCUMENT NUMBER: 140:166150  
 TITLE: Hydrogen Production and Carbon Formation during the Steam Reformer of Heptane in a Novel Circulating Fluidized Bed Membrane Reformer  
 AUTHOR(S): Chen, Zhongxiang; Yan, Yibin; Elnashaie, Said S. E. H.  
 CORPORATE SOURCE: Department of Chemical Engineering, Auburn University, Auburn, AL, 36849-5127, USA  
 SOURCE: Industrial & Engineering Chemistry Research (2004), 43(6), 1323-1333  
 CODEN: IECRED; ISSN: 0888-5885  
 PUBLISHER: American Chemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB Hydrogen production and carbon formation during the steam reforming of heptane over nickel-based catalyst are investigated in a circulating fluidized bed membrane reformer (CFBMR) at 723-823 K and 101.3-2026 kPa. A random carbon deposition and catalyst deactivation model is developed to account for the effect of carbon deposition on the overall reforming kinetics. The results show that the deposited carbon can be efficiently gasified by steam, hydrogen, carbon dioxide, or oxygen in this novel CFBMR, making carbon-free

operation practically possible, especially when steam to carbon feed ratio is higher than 2.5 mol/mol. The use of hydrogen permselective membranes breaks the equilibrium barriers associated with the reversible re-forming reactions and increases the hydrogen yield significantly. The introduction of oxygen into the adiabatic reformer can efficiently supply the heat necessary for the endothermic steam reforming through the exothermic oxidation, making an autothermal condition possible for the efficient production of hydrogen.

REFERENCE COUNT: 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 9 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2001:864736 CAPLUS  
DOCUMENT NUMBER: 136:8552  
TITLE: Autothermal catalytic steam reforming of hydrocarbons  
INVENTOR(S): Ahlborn, Rainer; Baumann, Frank; Wieland, Stefan  
PATENT ASSIGNEE(S): Omg Ag & Co. Kg, Germany; Umicore Ag & Co. KG  
SOURCE: Eur. Pat. Appl., 9 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: German  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1157968	A1	20011128	EP 2001-110816	20010504
EP 1157968	B1	20060503		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, CY, TR				
DE 10025032	A1	20011129	DE 2000-10025032	20000520
AT 325075	T	20060615	AT 2001-110816	20010504
US 2002009408	A1	20020124	US 2001-853902	20010514
US 7083775	B2	20060801		
CA 2348120	A1	20011120	CA 2001-2348120	20010517
JP 2002012408	A	20020115	JP 2001-147601	20010517
BR 2001002041	A	20011218	BR 2001-2041	20010518
PRIORITY APPLN. INFO.:			DE 2000-10025032	A 20000520

AB Autothermal catalytic steam reforming is carried out by leading a feed mixture of hydrocarbons, O<sub>2</sub>, and water or steam over a reforming catalyst. The reaction is operated adiabatically, and the reforming catalyst contains a Pt-group metal deposited on a support from a group of Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, TiO<sub>3</sub>, or their mixed oxide and zeolite. A steam/C ratio in the feed is (0.7-4):1. The resulting synthesis gas is suitable for manufacture of H<sub>2</sub> for fuel cells.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 10 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 1996:330713 CAPLUS  
DOCUMENT NUMBER: 125:14538  
TITLE: Simulation studies of autothermal reactor system for H<sub>2</sub> production from methanol steam reforming  
AUTHOR(S): Ma, L.; Jiang, C.; Adesina, A. A.; Trimm, D. L.; Wainwright, M. S.  
CORPORATE SOURCE: School of Chemical Engineering and Industrial Chemistry, University of New South Wales, Sydney, NSW, Australia  
SOURCE: Chemical Engineering Journal (Lausanne) (1996), 62 (2), 103-111  
CODEN: CMEJAJ; ISSN: 0300-9467

PUBLISHER: Elsevier  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB This paper reports the results of a math. investigation on the performance of a class of adiabatic dual-bed catalytic reactor systems with cylindrical and spherical geometries that may be used to promote internal heat exchange for the coupled reaction network. Anal. shows that, while the coaxial cylindrical system and the dual-bed single tubular reactor generally need optimal water-to-methanol feed ratios of about 3-4, the spherical arrangement always requires a ratio <1 for equivalent or even better performance. The spherical reactor system in which the oxidation catalyst was placed in the inner sphere with steam reforming in the annular space showed the most promising performance in terms of reactor efficiency (.apprx.80%) and H<sub>2</sub> production (125 m<sup>3</sup> gas/m<sup>3</sup> reactor/s) while the coaxial reactors exhibited the poorest efficiency (<10%) for a H<sub>2</sub> production rate of 19.5 m<sup>3</sup> gas/m<sup>3</sup> reactor/s. Thus the spherical reactor with an inner oxidation catalyst bed is the most attractive configuration for this autothermal process in terms of product maximization, feed and energy minimization.

L6 ANSWER 11 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 1995:452928 CAPLUS  
DOCUMENT NUMBER: 122:269347  
TITLE: Reactor modeling and simulations in synthesis gas production  
AUTHOR(S): De Groote, Ann M.; Froment, Gilbert F.  
CORPORATE SOURCE: Laboratorium voor Petrochemische Techniek,  
Universiteit Gent, Ghent, B9000, Belg.  
SOURCE: Reviews in Chemical Engineering (1995), 11(2), 145-83  
CODEN: RCEGD6; ISSN: 0167-8299

PUBLISHER: Freund  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Steam and CO<sub>2</sub> reforming, partial oxidation and autothermal reforming processes for synthesis gas production were considered. Detailed kinetics are required for the successful simulation of these processes. Kinetic equations for steam and CO<sub>2</sub> reforming were developed based on elementary steps between adsorbed species. Since the reactions are very fast, severe diffusion limitations occur. The thresholds for carbon formation based on methane cracking and the Boudouard reaction were determined in an electrobalance reactor. Tubular reactors for steam and CO<sub>2</sub> reforming were modeled based on a one-dimensional heterogeneous model accounting for internal diffusion limitations. In these simulations the heat fluxes along the reactor were calculated from a detailed temperature distribution in

the furnace using the FURNACE computer program. Tubular reactors for steam and CO<sub>2</sub> reforming were also simulated based on a two-dimensional model accounting for both radial and axial concentration gradients, leading to more accurate bounds for carbon deposition. The catalytic partial oxidation of CH<sub>4</sub>/O mixts. in an adiabatic fixed bed reactor was simulated based on the kinetics for total combustion, steam reforming, and water gas shift reaction. Finally, the catalytic partial oxidation of CH<sub>4</sub> to synthesis gas in an adiabatic reversed flow reactor was modeled. This is a transient operation and the traveling waves of temperature and concns. were simulated for typical operating conditions.

L6 ANSWER 12 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 1993:606619 CAPLUS  
DOCUMENT NUMBER: 119:206619  
TITLE: Steam reforming. Opportunities and limits of the

AUTHOR(S): technology  
Rostrup-Nielsen, Jens; Dybkjaer, Ib; Christiansen, Lars J.

CORPORATE SOURCE: Haldor Topsoe A/S, Lyngby, DK-2800, Den.

SOURCE: NATO ASI Series, Series E: Applied Sciences (1992), 225 (Chemical Reactor Technology for Environmentally Safe Reactors and Products), 249-81

CODEN: NAESDI; ISSN: 0168-132X

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB A review, with 57 refs., of advances in reactor mech. design and modeling of the conventional tubular reformer, as well as the heat-exchange reformer. Other topics covered include the role of adiabatic pre-reforming, autothermal reforming, CO<sub>2</sub> reforming, main requirements of the catalysts, control of tube wall temperature, carbon deposit formation, manufacture of synthesis gas (with examples), and a comparison of direct conversion of CH<sub>4</sub> with indirect conversion via steam reforming.

L6 ANSWER 13 OF 13 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1988:115635 CAPLUS

DOCUMENT NUMBER: 108:115635

TITLE: Autothermal production of synthesis gas

INVENTOR(S): Lewis, Jerry Lee

PATENT ASSIGNEE(S): Fluor Corp., USA

SOURCE: Faming Zhuanli Shengqing Gongkai Shuomingshu, 9 pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 85101360	A	19870131	CN 1985-101360	19850401
CN 1008350	B	19900613		

PRIORITY APPLN. INFO.: CN 1985-101360 19850401

AB An apparatus for steam reforming of hydrocarbon feedstocks to produce H-rich fuel gases comprises a vertical reactor equipped with >1 reforming tubes packed with catalysts, >1 buffering plates fixed on the reactor walls, and a combustor having an extended pipe communicated with the bottom of the reforming tubes. The hydrocarbon feedstocks are preferably the byproduct effluents (containing MeOH or ETOH) from an NH<sub>3</sub>-manufacturing plant, mixed with steam, and fed into the top of the reforming reactor at 900-1300°F. The O-rich air is injected from the bottom of the combustor, and the gaseous effluents from the combustor are introduced into a 2nd catalytic reforming zone, and then passed through the outer surface of the reforming tubes. The inner walls of the reforming reactor are preferably made of adiabatic materials to prevent heat loss. The apparatus reduces operation time and increases the yield of H-rich fuel gases.

## Freeform Search

---

**Database:**  US Pre-Grant Publication Full-Text Database  
 US Patents Full-Text Database  
 US OCR Full-Text Database  
 EPO Abstracts Database  
 JPO Abstracts Database  
 Derwent World Patents Index  
 IBM Technical Disclosure Bulletins

**Term:**

**Display:**  **Documents in Display Format:**  **Starting with Number**

**Generate:**  Hit List  Hit Count  Side by Side  Image

---

---

### Search History

---

**DATE:** Tuesday, January 02, 2007 [Purge Queries](#) [Printable Copy](#) [Create Case](#)

<u>Set Name</u>	<u>Query</u>	<u>Hit Count</u>	<u>Set Name</u>
side by side			result set
DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=ADJ			
<u>L3</u>	L2 and (preheat\$3 or pre near1 heat\$3 or heat\$3 near3 feedstock)	9	<u>L3</u>
<u>L2</u>	l1 and autothermal	15	<u>L2</u>
<u>L1</u>	adiabatic with catalytic near4 steam reform\$3	25	<u>L1</u>

END OF SEARCH HISTORY

## WEST Search History

DATE: Tuesday, January 02, 2007

<u>Hide?</u>	<u>Set Name Query</u>	<u>Hit Count</u>
<i>DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=ADJ</i>		
<input type="checkbox"/>	L13 l12 and ceramic	7
<input type="checkbox"/>	L12 L11 not l3	7
<input type="checkbox"/>	L11 L10 and autothermal	10
<input type="checkbox"/>	L10 L9 and monolith	17
<input type="checkbox"/>	L9 catalyt\$3 near3 steam near3 reform\$3 same adiabatic	59
<input type="checkbox"/>	L8 L7 not l3	6
<input type="checkbox"/>	L7 L6 and autothermal	9
<input type="checkbox"/>	L6 L5 and adiabatic	16
<input type="checkbox"/>	L5 L4 and cataly\$3 near4 steam near2 reform\$3	75
<input type="checkbox"/>	L4 ceramic monolith	1295
<input type="checkbox"/>	L3 L2 and (preheat\$3 or pre near1 heat\$3 or heat\$3 near3 feedstock)	9
<input type="checkbox"/>	L2 l1 and autothermal	15
<input type="checkbox"/>	L1 adiabatic with catalytic near4 steam reform\$3	25

END OF SEARCH HISTORY